§ 34.30 Exhaust Emissions (In-Use Aircraft Gas Turbine Engines)

(c) Engines (including engines that are determined to be derivative engines for the purposes of emission certification) type certificated with characteristic levels at or below the NOX standards of §34.21(d)(1)(vi) of this part (as applicable based on rated output and rated pressure ratio) and introduced before July 18, 2012, may be produced through December 31, 2012, without meeting the NOX standard of paragraph (a)(2) of this section.


Subpart D—Exhaust Emissions (In-Use Aircraft Gas Turbine Engines)

§ 34.30 Applicability.

The provisions of this subpart are applicable to all in-use aircraft gas turbine engines certificated for operation within the United States of the classes specified, beginning on the dates specified in §34.31.

§ 34.31 Standards for exhaust emissions.

(a) Exhaust emissions of smoke from each in-use aircraft gas turbine engine of Class T8, beginning February 1, 1974, shall not exceed a smoke number (SN) of 30.

(b) Exhaust emissions of smoke from each in-use aircraft gas turbine engine of Class TF and of rated output of 129 kN (29,000 lb) thrust or greater, beginning January 1, 1976, shall not exceed SN=83.6(rO)^-0.274 (rO is in kN).

(c) The standards set forth in paragraphs (a) and (b) of this section refer to exhaust smoke emission emitted during operation of the engine as specified in the applicable sections of subpart G of this part, and measured and calculated in accordance with the procedures set forth in subpart G.


Subpart E—Certification Provisions

§ 34.48 Derivative engines for emissions certification purposes.

(a) General. A derivative engine for emissions certification purposes is an engine configuration that is determined to be similar in design to a previously certificated (original) engine for purposes of compliance with exhaust emissions standards (gaseous and smoke). A type certificate holder may request from the FAA a determination that an engine configuration is considered a derivative engine for emissions certification purposes. To be considered a derivative engine for emission purposes under this part, the configuration must have been derived from the original engine that was certificated to the requirements of part 33 of this chapter and one of the following:

1. The FAA has determined that a safety issue exists that requires an engine modification.

2. Emissions from the derivative engines are determined to be similar. In general, this means the emissions must meet the criteria specified in paragraph (b) of this section. The FAA may amend the criteria of paragraph (b) in unusual circumstances, for individual cases, consistent with good engineering judgment.

3. All of the regulated emissions from the derivative engine are lower than the original engine.

(b) Emissions similarity. (1) The type certificate holder must demonstrate that the proposed derivative engine model’s emissions meet the applicable standards and differ from the original model’s emission rates only within the following ranges:

   (i) ±3.0 g/kN for NOx.
   (ii) ±1.0 g/kN for HC.
   (iii) ±5.0 g/kN for CO.
   (iv) ±2.0 SN for smoke.

(2) If the characteristic level of the original certificated engine model (or any other sub-models within the emission type certificate family tested for certification) before modification is at or above 95% of the applicable standard for any pollutant, an applicant must measure the proposed derivative engine model’s emissions for all pollutants to demonstrate that the derivative engine’s resulting characteristic levels will not exceed the applicable emission standards. If the characteristic levels of the originally certificated engine model (and all other sub-models within the emission type certificate family tested for certification) are below 95%
of the applicable standard for each pollutant, the applicant may use engineering analysis consistent with good engineering judgment to demonstrate that the derivative engine will not exceed the applicable emission standards. The engineering analysis must address all modifications from the original engine, including those approved for previous derivative engines.

(c) Continued production allowance. Derivative engines for emissions certification purposes may continue to be produced after the applicability date for new emissions standards when the engines conform to the specifications of this section.

(d) Non-derivative engines. If the FAA determines that an engine model does not meet the requirements for a derivative engine for emissions certification purposes, the type certificate holder is required to demonstrate that the engine complies with the emissions standards applicable to a new engine type.


Subpart F [Reserved]

Subpart G—Test Procedures for Engine Exhaust Gaseous Emissions (Aircraft and Aircraft Gas Turbine Engines)

§ 34.60 Introduction.

(a) Use the equipment and procedures specified in Appendix 3, Appendix 5, and Appendix 6 of ICAO Annex 16, as applicable, to demonstrate whether engines meet the applicable gaseous emission standards specified in subpart C of this part. Measure the emissions of all regulated gaseous pollutants. Use the equipment and procedures specified in Appendix 2 and Appendix 6 of ICAO Annex 16 to determine whether engines meet the applicable smoke standard specified in subpart C of this part. The compliance demonstration consists of establishing a mean value from testing the specified number of engines, then calculating a “characteristic level” by applying a set of statistical factors that take into account the number of engines tested. Round each characteristic level to the same number of decimal places as the corresponding emission standard. For turboprop engines, use the procedures specified for turbofan engines, consistent with good engineering judgment.

(b) Use a test fuel that meets the specifications described in Appendix 4 of ICAO Annex 16. The test fuel must not have additives whose purpose is to suppress smoke, such as organometallic compounds.

(c) Prepare test engines by including accessories that are available with production engines if they can reasonably be expected to influence emissions. The test engine may not extract shaft power or bleed service air to provide power to auxiliary gearbox-mounted components required to drive aircraft systems.

(d) Test engines must reach a steady operating temperature before the start of emission measurements.

(e) In consultation with the EPA, the FAA may approve alternative procedures for measuring emissions, including testing and sampling methods, analytical techniques, and equipment specifications that differ from those specified in this part. Manufacturers and operators may request approval of alternative procedures by written request with supporting justification to the FAA Aircraft Certification Office and to the Designated EPA Program Officer. To be approved, one of the following conditions must be met:

(1) The engine cannot be tested using the specified procedures; or

(2) The alternative procedure is shown to be equivalent to, or more accurate or precise than, the specified procedure.

(f) The following landing and takeoff (LTO) cycles apply for emissions testing and for calculating weighted LTO values: